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Notice of Allowability	Application No.	Applicant(s)	
	10/823,091	EKSETH ET AL.	
	Examiner	Art Unit	
	R. Alexander Smith	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.
2. ☒ The allowed claim(s) is/are 1-38.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>20041213, 20040701</u> | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input checked="" type="checkbox"/> Other <u>3. IDS cont: & 20051007.</u> |

Reasons for Allowance

1. The following is an examiner's statement of reasons for allowance of claims 1-38.

For independent claims 1 and 24 the prior art of record does not disclose or clearly suggest a survey tool and a control system, respectively, having
a plurality of rotation sensors, each rotation sensor having a sensing axis and a direction of least acceleration sensitivity;
the plurality of rotation sensors mounted in a housing with their sensing axes generally parallel to one another and with their directions of least acceleration sensitivity generally non-parallel to one another;
the weighted average including the detected angular rotation rate of each rotation sensor about its sensing axis weighted by the detected acceleration along its direction of least acceleration sensitivity
in combination with the remaining limitations of the claim.

Claims 2-23 recite limitations which, in combination with allowed claim 1, render the dependent claims allowable.

For independent claim 25 the prior art of record does not disclose or clearly suggest a method of determining an orientation of a survey tool within the borehole, the method comprising
providing a plurality of rotation sensors, each rotation sensor having a sensing axis and a direction of least acceleration sensitivity;
the plurality of rotation sensors having their sensing axes generally parallel to one another and their directions of least acceleration sensitivity generally non-parallel to one another;

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calculating a weighted average, the weighted average including the detected angular rotation rate of each rotation sensor about its sensing axis weighted by the detected acceleration along its direction of least acceleration sensitivity

in combination with the remaining limitations of the claim.

Claims 26-37 recite limitations which, in combination with allowed claim 25, render the dependent claims allowable.

For independent claim 38 the prior art of record does not disclose or clearly suggest a rotatably steerable drilling system comprising a drill string, a survey tool in proximity, the survey tool having

a plurality of rotation sensors, each rotation sensor having a sensing axis and a direction of least acceleration sensitivity;

the plurality of rotation sensors mounted in a housing with their sensing axes generally parallel to one another and with their directions of least acceleration sensitivity generally non-parallel to one another;

the weighted average including the detected angular rotation rate of each rotation sensor about its sensing axis weighted by the detected acceleration along its direction of least acceleration sensitivity

in combination with the remaining limitations of the claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

2. The prior art made of record is considered pertinent to Applicant's disclosure. The prior art cited in PTO-892 disclose related survey tools, systems and methods.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to R. Alexander Smith whose telephone number is 571-272-2251. The examiner can normally be reached on Monday through Friday from 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F. Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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RAS
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